1 DESIGN O] 'TH E OPTICAL, COMMUNICATION DEMONSTRATOR INSTURMENT OPTICAL, SYSTEM

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Abstract

This paper describes the optical system design for the Optical Communication Demonstrator (OCD) instrument. With an aperture of only 4 inches, the OCD instrument is designed to demonstrate the capability of communicating from space to a ground station with a very small instrument using optical wave.lc.II~llIs. To minimize the size and complexity of the instrument, the same optical elements tire used to both transmit and receive signals. The transmit and receive signals differ by 64 nanometers and are separated in the instrument by a spectral beamsplitter. Three optical paths/channels are provided in the instrument. A transmit channel, a receive channel and a boresight channel. The transmit channel transmits a modulated solid slate last.1 signal to a ground station on the surface. of the earth. 'The receive channel images a beacon signal from the ground station on the receive channel detector. Some of the. energy from the transmit channel is also imaged on the receive detector via the boresight channel. The relative position of the two images on the detector is used to accurately aim the transmit signal at the ground station. Coarse aiming of the OCD instrument at the ground station is achieved using a two axis instrument gimbal. Precise high speed aiming of the transmit signal is achieved using a two axis fast steering mirror in the transmit channel.